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Toward an Operant Model of Power in Organizations

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The purpose of this paper is to suggest that behavior analysis can help to explain social power. In this approach, an individual's potential for influence is thought to be partially a function of his or her access to stimuli that can be used as consequences. This access can occur either through direct authority or indirectly through social networks and exchanges. Social power is also thought to be a function of an individual's skill in delivering the stimuli in ways that will have the most impact on behavior. A number of predictions about power based on an operant approach are offered.

Key words: social power, power holder, degree of power, control of reinforcers, social networks

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Many years ago, Bertrand Russell suggested that the fundamental concept in social science should be power, in the same way that energy is the fundamental concept in physics (Russell, 1938). Others also suggested that a theory of power should be central to social psychology and could serve as a unifying principle for social science (Cartwright, 1959; Clark, 1965). Years later, organizational researchers still acknowledged that power plays a major part in interactions in organizations, and beginning in 1975, the study of power became faddish in the field of management (Mintzberg, 1983; Pfeffer, 1981). However, power has yet to serve as a unifying principle, despite Russell's vision. Instead, many problems have been evident in the literature on power over the years. Power has been termed a "bottomless swamp" (Dahl, 1957, p. 201) and "the messiest problem of all" (Perrow, 1970, p. ix). Major analyses of power have been criticized for failing to generate a distinctive and coherent set of predictions (Schopler, 1965) and for containing unstated assumptions (Hollander & Offermann, 1990). Conceptualizations of power have been heterogeneous, and the relation of different models of power to each other has not been clear (Pollard & Mitchell, 1972). In addition, the research literature on power has not been well integrated with the literature on other social processes (Hollander & Offermann, 1990).

Malagodi (1986) suggested that behavior analysts develop relations with other disciplines to find and examine research questions that would benefit from the unique vantage point of behavior analysis. Indeed, in the past, behavior analysis has offered more parsimonious, predictive, and complete accounts of behaviors in organizations than have other conceptual frameworks; in addition, these behavior-analytic accounts have often also served to reconcile seemingly opposed explanations (e.g., the behavior-analytic account of escalation; see commentary by Hantula, 1992). However, just as in social psychology (Kipnis, 2001), much of behavior-analytic work to date has focused on the individual whose behavior is being changed. The organizational behavior management (OBM) literature, for example, typically addresses what should be done to improve worker performance, with the emphasis on worker behaviors such as sales and safety (e.g., Martinko, Casey, & Fadil, 2001; Sulzer-Azaroff, McCann, & Harris, 2001). Less attention

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has been given to the behavior of individuals, such as managers, who have the means to influence others' behavior. Furthermore, this attention has been primarily limited to managers' roles in performance interventions. An exception to this is recent work that treats leadership as a special class of operant behavior (e.g., Komaki, 1998; Mawhinney, 2001; Rao & Mawhinney, 1991). However, leadership is not the only element of social influence that is amenable to a behavioral analysis. As Homans (1961, 1987) suggested, a number of other social features of groups, such as their norms, competition, justice, and power, could be understood using behavioral psychology. Therefore, the purpose of this paper is to illustrate ways in which behavior analysis could be helpful in understanding social power.

Social power, also referred to simply as "power" in this paper, is defined as the potential ability of one individual to influence another individual within a certain system (French & Raven, 1959). The present discussion is built on an operant framework and draws upon well-established reinforcement effects. First, various components of power are analyzed. Next, the ways in which power holders are identified are considered. Finally, issues concerning the measurement of power are discussed. Some predictions generated from these discussions are summarized at the end of each section in the form of propositions, to provide an initial set of clearly identifiable expectations based on an operant analysis of power. The current discussion and related predictions are not intended to be a fully complete account of power, but could be built upon both conceptually and empirically to construct an expanded analysis of the system-wide dynamics of power in organizations. An operant model of power could serve to increase our heretofore rather limited understanding of power and serve as a basis for a broader consideration of contingencies in organizations. An operant model could also be used as a basis for developing more accurate measures of organizational power and for designing organizational interventions.

PREVIOUS ANALYSES OF POWER

Kipnis (2001) noted that power can be understood in terms of Hobbes' (1968) observation that, from birth to death, people have an endless appetite for a variety of stimuli, such as affection, material goods, services, and information. People depend on one another to obtain such stimuli, and those with access to these resources have power over others because of this dependence (Blau, 1964; Emerson, 1962; Kipnis, 1976, 2001). Resources associated with the power holder regardless of his or her position in the organization are called *personal* resources; those available to the power holder primarily through his or her position in an organization are called *institutional* resources (Kipnis, 2001). Personal resources include information, physical skills, and affection or approval. Institutional resources include access to people, machinery, and money.

A number of types of individual power have been identified in the social psychological literature. These types are based to a large extent on the particular resource over which the power holder has control. The most well-recognized types of power were identified by French and Raven (1959). Their five bases of power include reward power, in which the power holder has the ability to influence others through the control of rewards, and coercive power, in which the power holder has the ability to influence others through the control of punishment. Other bases of power in French and Raven's taxonomy are legitimate power, based on the belief of others that the power holder has the right to exert power, particularly in terms of decision-making authority; expert power, based on the power holder's special knowledge; and referent power, based on admiration by others of the power

holder and their desire for his or her approval. Additional sources of power identified later by researchers investigating French and Raven's taxonomy are persuasive power and information power (e.g., Yukl & Falbe, 1991). Information power refers to control over the distribution of information, whereas persuasive power refers to skill in making rational appeals.

Mintzberg (1983) provided a slightly different analysis of power, also with five general bases. Several of these are similar to the bases identified by French and Raven (1959). Mintzberg's "control over resources" parallels reward and coercive power; his "control over a technical skill or a body of knowledge" parallels expert power; and his "power based on legal prerogatives" parallels legitimate power. Interestingly, Mintzberg's last base of power—power derived from access to those who have the other bases of power—appears to diverge somewhat from that of French and Raven's concept of referent power.

Mintzberg's (1983) last base of power makes an important point. Control over resources and therefore, power, can be either formally or informally obtained. Certainly, one would expect most managers to have a good degree of power due to direct control over resources by virtue of their positions. Nonmanagers' access to resources, on the other hand, is likely to be more indirectly and informally obtained, such as through their influence over those with direct control over desired resources. For example, Mintzberg noted,

> Privileged access [to power holders] provides power not primarily for the information it brings—although this can be a factor too—but for the resources that can be made available, the decision that can be swung by a word dropped at an opportune moment, the favors that can open up, all the crumbs that fall around those with power. (p. 186)

Thus, informal power is based on interactions within a social network rather than on positions in the formally defined division of labor (Monge & Eisenberg, 1987). Huy (2001) suggested that individuals whose power exceeds their formal authority are often managers who are at the center of a large informal network and who have skill in influencing. Research indicates that formal and informal power have differing effects, depending on the specific area in which influence is to be exercised (Ibarra, 1993). With certain activities, such as innovation in administrative functions, informal power can be more critical to producing behavior change.

The strategic contingencies theory of power (Hickson, Hinings, Lee, Schneck, & Pennings, 1971) describes the accumulation of informal power via social networks. This model suggests that an individual has greater potential for establishing valuable informal relationships in an organization when he or she oversees critical functions or can provide others with critical resources (Perrow, 1970; Salancik & Pfeffer, 1974), regardless of whether the control of important functions and resources was acquired through formal authority or through informal methods. In addition, factors such as the individual's visibility and centrality in the social network will affect the nature of power relationships. For instance, individuals who are central to the informal flow of information in an organization will be contacted more frequently by others who have or need information (Hickson et al., 1971; Hinings, Hickson, Pennings, & Schneck, 1974; Kanter, 1979; Pfeffer, 1992). In turn, relationships in the informal organizational network can serve to increase the individual's power through increasing access to various valued resources (e.g., Brass, 1992; Ibarra & Andrews, 1993). This is likely to be true of departments with strong network ties as well. Research suggests that more powerful units are more likely to obtain larger shares of resources, such as increased budgets and personnel (Hills & Mahoney, 1978; Pfeffer & Moore, 1980; Pfeffer & Salancik, 1974; Salancik & Pfeffer, 1974; Welbourne &

Trevor, 2002). Informal networks are critical for success in many organizations because no one individual or department has access to all the information and resources necessary for effective performance (Kaplan & Mazique, 1983; Pfeffer & Konrad, 1991).

Social exchange models (e.g., Blau, 1964; Emerson, 1962, 1972; Homans, 1961; Thibaut & Kelley, 1959) explain how these networks provide increased access to resources. Networks often consist of strategic alliances, which are defined in terms of reciprocity—the notion that one good turn deserves another (Cohen & Bradford, 1990). Social exchange theory suggests that a person who renders another person important services or valuable gifts builds "social credits" by creating an obligation on the part of the recipient to return the favor (Blau, 1974). In a mutual social exchange, the nature and timing of the repayment are up to the discretion of the recipient of the original benefit. This continuing mutual exchange is thought to strengthen bonds between equals (Blau).

Social exchange theories also suggest that a relationship can become unequal when one party has not sufficiently discharged his or her obligations to another over time (Blau, 1974). Because of the indebtedness, there is an imbalance of power. This imbalance leads to the benefactor's ability to demand compliance, unlike in an equal relationship when repayment occurs at the discretion of the obligated party. This suggests that, although networks can be used to gain access to resources and information to increase one's power over others, favors received in the network should be returned in a timely manner to avoid demands by the benefactors.

What are the behavioral effects of the different sources of power? Research conducted on French and Raven's (1959) taxonomy (Warren, 1968) suggests that, of all the sources of power, reward and coercive power appeared to be the most significantly correlated with conformity, where conformity was defined as compliance with the behavior preferred by the power holder (Merton, 1959). Higher levels of conformity were found in situations in which multiple power bases occurred together (Warren, 1968). These findings are consistent with research demonstrating that managers' contingent use of rewards and punishers is positively related to performance (Arvey & Ivancevich, 1980; Hunt & Schuler, 1976; Podsakoff, Todor, Grover, & Huber, 1984; Podsakoff, Todor, & Skov, 1982; Sims & Szilagyi, 1975).

Although the term *power holder* is used throughout this paper in reference to an individual who has the potential to influence others, the term is meant to reflect the power literature, which recognizes that power is reciprocal in nature. First, potential for influence is in large part determined by those who are being influenced. For example, French and Raven (1959) defined all five of their proposed bases of power as being dependent on one person's perception that another person has a certain valued ability, such as the ability to provide rewards, the ability to mediate punishment, or the ability to provide needed information. As soon as that perception is gone, the power holder has lost power. In fact, Hollander and Offermann (1990) identified the ability to resist the power of others as a type of power in itself called "power from," in contrast to "power over" and "power to" (commonly called empowerment). Second, the manner in which power is used affects not only the targets of power but also the power holders themselves. Newton's second law states that for every action there is an equal reaction. Kipnis (2001) suggested that Newton's second law also applies to power, in that power holders cannot use power to change others without also affecting themselves. For instance, according to social exchange models, power holders can either build social credits with others by providing favors or reduce social credits by demanding favors (Blau, 1974).

A BEHAVIORAL APPROACH TO DEGREE OF POWER

Degree of Power: Access to and Control of Stimuli That Can Be Used as Consequences

Recall that power has been defined in social psychology as a potential for influence. An operant approach suggests that control over consequences implies control over key dimensions of those consequences (e.g., immediacy, frequency, etc.), and that the more people for whom consequences are controlled, the more potential exists to evoke desired responses and suppress undesired ones. Thus, a behavior-analytic account of power suggests that the degree of power an individual has is in part a function of (a) the number of reinforcing and aversive stimuli the power holder has access to that could be used as consequences; (b) the important dimensions of these consequences, such as magnitude, delay, frequency, and schedule, over which the power holder has control; and (c) the number of individuals for whom the power holder controls the consequences.

Number and schedule of consequences. Certainly the idea that a power holder has increased power with increased access to stimuli that can be used as consequences is not a new one. However, operant research sheds additional light on how control over the number and delivery of consequences can affect one's potential for influencing responding. The patterning of reinforcement in time has consistently been found to affect the patterning of behavior in time (e.g., Ferster & Skinner, 1957). For instance, variable schedules maintain steadier responding than fixed schedules, and ratio schedules maintain higher response rates than interval schedules. The numbers of consequences in the schedule also affect response patterns; but these effects depend on the nature of the reinforcement schedule (e.g., Schwarz, 1978). Changes in frequency of reinforcement on variable schedules do not change the steadiness of responding, but they do change the rate of responding. For fixed schedules, changing the frequency of consequences (e.g., by requiring more responses for a reinforcer) can affect the length of the pauses following bursts of responding.

These effects suggest that power holders who have access to more stimuli that can be used as consequences should be able to provide positive outcomes at a higher rate and therefore evoke relatively higher rates of desired behavior from workers (e.g., projects completed on time, high-quality work). In addition, higher and steadier rates of responses are possible if power holders control the schedule of reinforcement delivery. For example, research in organizations on pay schedules indicates that switching from a time-based to response-based schedule substantially increases performance (George & Hopkins, 1989; Wagner, Rubin, & Callahan, 1988) and that a variable-ratio pay schedule results in higher performance than a fixed-ratio pay schedule (Latham & Dossett, 1978).

Another example of how operant research can be useful for understanding power based on control over the number of consequences concerns situations in which responders are given two or more concurrently available sources of reinforcement, as when a power holder is delivering different rates of consequences for different tasks or when a worker performs tasks for separate power holders who differ in their power levels. Research on choice behavior indicates that individuals match their relative response rates to the relative rate of positive outcomes received from each alternative (for reviews, see Davison & McCarthy, 1988; Williams, 1988). Thus, workers are likely to respond at a higher rate on tasks for which a power holder is providing higher rates of reinforcement. In addition, workers are likely to respond at higher rates to power holders who are able to provide higher rates of reinforcers.

Of course, these expectations as-

sume that various conditions are present for matching to occur. (These can often be difficult to ascertain because in organizations the issue is typically not whether schedules of reinforcement are operating, but which schedules are operating; Hantula, 2001.) The alternative sources of reinforcement must be concurrently available. In addition, the schedules are assumed to be independent of each other, such as occurs with concurrent variable-interval schedules. Note also that departures from matching have sometimes been found with human choice behavior, possibly because of rule-governed behavior (Lowe & Horne, 1985). For instance, human participants with some training in economics have been found to maximize rather than match (Mawhinney, 1982). However, matching has been found to account for a large proportion of the variance of human choice behavior in a number of studies (e.g., Mawhinney, 1982, 1988; McDowell, 1988).

The relative rate of positive outcomes also contributes to behavioral momentum, the tendency for reinforced behavior to continue in the face of extinction or punishment (Nevin, Mandell, & Atak, 1983). In other words, relative response rate and behavioral momentum are functionally related to relative rate of reinforcement in a similar manner. Thus, compared to power holders with little control, one would expect that power holders with greater control over consequences in an organization could evoke not only relatively higher rates of responding by workers but also relatively greater maintenance of responding even after contingencies change. For example, if two power holders were stripped of access to key resources in the organization due to structural changes, workers would likely maintain more responding for the individual who previously had greater control over consequences.

It should be acknowledged at this point that there has been disagreement in the literature over the extent to which the matching law is useful for explaining complex behavior in the workplace (see Fuqua, 1984; Mawhinney & Gowen, 1991; Poling & Foster, 1993; Redmon & Lockwood, 1987). Some have argued that the matching law could be used to guide decision making by practitioners and to design applied interventions more effectively (Redmon & Lockwood). Others have questioned whether matching is applicable when settings involve schedules that operate in a noncompetitive manner and when behavior in those settings is rule governed (Poling & Foster). Because behavioral momentum is functionally related to matching, this calls into question the utility of the concept of momentum in understanding behavior in organizations as well. However, more recent analogue studies of organizational decision making have provided evidence of both matching and momentum (e.g., Goltz, 1999; Hantula & Crowell, 1994; Sokolowski, 1997). Although the extent to which these effects generalize to various organizational tasks and settings still remains to be seen, these studies do suggest that some matching and momentum effects probably occur in organizations.

Magnitude, frequency, immediacy, quality, and variability of consequences. Several other factors, in addition to the number and schedule of outcomes, have also been found to affect response rate. These include the magnitude of the outcomes, the delay with which they occur, their relative quality, and their relative variability (e.g., Bedell & Grace, 1997; Catania, 1963; Chung, 1965; Chung & Herrnstein, 1967; Goltz, 1999; Grace, 1995; Grace & Nevin, 1997; Mace, Mauro, Boyajian, & Eckert, 1997; Mazur, 1996). Responses occur at relatively higher rates when consequences are more immediate, larger, of higher quality, and more variable.

Most power holders in organizations have control over certain dimensions for some reinforcing and aversive stimuli and over other dimensions for other stimuli. For example, they may be able

to change amount but not frequency for pay increases, or delay but not amount for vacations. A behavioral analysis suggests that power holders should be able to increase their potential for influence over behavior with an increased control over all of the dimensions that have been associated with increased responding, such as the delay, quality, variability, magnitude, schedule, and frequency of outcomes. For example, an individual who can control the timing of bonuses, and not just whether they are delivered, will be able to deliver them immediately after the desired behavior occurs.

The operant literature also suggests that if power holders are not able to control all of these dimensions of consequences, they should first seek to acquire control over the dimensions to which an individual is most sensitive, because sensitivity to changes in reinforcement differs across dimensions. For example, in some contexts, sensitivity to changes in reinforcer durations and amounts has been found to be lower than sensitivity to changes in reinforcer frequency (e.g., Davison & McCarthy, 1988). However, dimension sensitivity is likely to differ across individuals and organizations.

The dimensions of delay and magnitude of consequences also influence the effectiveness of punishment. Increased delay of punishers results in less suppression of behavior (e.g., Baron, 1965; Camp, Raymond, & Church, 1967). In addition, mild punishment followed by increased magnitudes of punishment is less effective than the opposite sequence (Azrin, Holz, & Hake, 1963; Miller, 1960). Thus, increased control over aversive stimuli (e.g., the ability to immediately assign undesirable tasks following undesirable behaviors) should also serve to increase an individual's power in an organization, providing more effective suppression of undesired behaviors (e.g., tardiness, defective work, unsafe behaviors).

To date, the literature on power has considered primarily only one of the dimensions of consequences that contribute to increased responding: magnitude. For example, according to Kipnis (1976), "The scarcer the commodity and the more it is valued, the greater the power holder's potential for exercising influence" (p. 21). Similarly, French and Raven (1959) stated that the strength of reward and coercive power depend upon the magnitude of the rewards and punishers the power holder controls. Thus, an operant analysis can contribute to the literature on power through identification of other dimensions of consequences that are relevant to an individual's potential for influence.

Increased control by workers over various dimensions of consequences may explain research findings on empowerment, a recent trend in management that involves sharing power to allow workers to act more freely within some areas of organizational operations (Hollander & Offerman, 1990). Two forms of distributing power are delegation and worker participation in decision making. Of these, delegation has shown stronger correlations with improved subordinate performance than has participation (Leana, 1987). Performance in this particular study was the number of insurance claims processed and the cost of those claims (with lower cost indicating improved performance). The increased performance observed with delegation may have occurred because delegation often allows workers greater control over consequences for performance than does participation. For example, one popular method of delegation in organizations involves the use of self-managed work teams. Self-managed teams are allowed greater control over tasks, such as selecting and training new members, allocating jobs to members, managing production levels, solving production problems, delivering finished goods, and providing feedback and compensation related to performance of the group as a whole (e.g., Goodman, Devadas, & Hughson, 1988; Hackman, 1976). Research suggests

that the success of these teams is most associated with the degree to which members are encouraged to observe, evaluate, and reinforce team efforts (Manz & Sims, 1987). Thus, empowerment may work best when workers have greater control over the type of consequences (e.g., informational, social, organizational) provided to group members and when that control can be used to reduce the delay and increase the frequency and reliability of the delivery of these consequences.

Number of target persons. Degree of power is also viewed as being a function of the number of individuals for whom the power holder controls consequences. A power holder's potential for influence refers not only to the rate of responding by an individual worker but also to the potential total rate of responding across workers. For example, individuals in top levels of an organizational hierarchy are generally rated as higher in power than individuals at lower levels (e.g., Yukl & Falbe, 1991). Individuals higher in the hierarchy usually control consequences for larger numbers of people and thus have the potential for evoking a whole set of behaviors across the organization rather than just in one unit. Power holders can also increase their power through controlling consequences for more people across their informal networks of strategic alliances. When a power holder is able to evoke a high rate of responding across many individuals in the organization, he or she has great potential for influencing the direction of an entire organization.

Behavioral systems analysis (e.g., Brethower, 1982; Rummler & Brache, 1995) might be especially useful in making sense of power dynamics across large numbers of people both in terms of the formal hierarchy as well as in informal networks. A power holder's degree of power can be based on complex sets of social contingencies, particularly for those who are at higher levels in the organization or those who have extensive networks. Thus, using a behavioral systems analysis approach (e.g., Krapfl & Gasparotto, 1982) would probably result in the most complete assessment of an individual's degree of power. Data on networks have been used to produce a relationship map, a behavioral systems analysis tool suggested by Rummler and Brache for analyzing organization-wide activities.

Another benefit of a systems analysis is that it provides a molar focus. Rather than considering one power holder at a time, the interrelationships among power holders are examined. For instance, a behavioral systems view of formal power suggests that formal power consists of a set of contingencies that occur vertically in the organization using formally authorized control of consequences. The CEO provides consequences for the responses of the president, the president for the responses of the vice president, and so forth down the chain of command. Also, the responses of each subordinate result in consequences for each manager from the manager above because worker responses affect departmental performance. In addition, a systems analysis suggests that informal networks of strategic alliances provide sets of contingencies that operate horizontally and diagonally across the hierarchy rather than vertically. An example of a horizontal interaction is a marketing manager granting a favor to someone in another department at his or her same level, such as an operations manager. The operations manager, in turn, might grant a favor to an engineer in the research and development (R&D) department. This would represent a diagonal interaction because it occurs simultaneously across departments and across position levels; the operations manager is at a higher level in the organizational hierarchy than the R&D engineer. The favors consist of providing information, resources, services, or some other form of support. Based on the social exchange model of power (e.g., Blau, 1974), one would expect most of these contingencies to be reciprocal, in that individuals in the network reward each

others' past support by delivering needed information, resources, and services in return.

In summary, based on an operant analysis, the following are expected with regard to degree of power in terms of access to, and control over, stimuli that can be used as reinforcers and punishers:

1. An individual can increase power through both an increase in control of the number of different reinforcers and an increase in control over critical dimensions of each of those reinforcers such as schedule, magnitude, frequency, quality, variability, and delay.
2. An individual can increase power through both an increase in control of the number of different aversive stimuli and an increase in control over critical dimensions of each of those stimuli, such as schedule, magnitude, and delay.
3. An individual can increase power through an increase in the number of people for whom he or she controls consequences.

Degree of Power: Expertise in Making Effective Use of Stimuli as Consequences

An individual's access to stimuli that can be used as consequences, either through direct authority or indirectly through social networks and exchanges, is not the only determinant of his or her potential to influence behavior. Recall Huy's (2001) comment that those who have accumulated significant power beyond their authority often have done so both through building networks and through skill in influencing. Operant principles suggest that this skill consists of the power holder's expertise in delivering the stimuli in ways that will have the most impact on behavior.

Delivering consequences effectively in an organization is not always a simple matter; the effectiveness of reinforcement and punishment contingencies is subject to a variety of factors such as the schedule of delivery of the reinforcer (for a review, see Kazdin, 1975). In addition, uncontrollable variables such as individual learning history can influence how each person will respond. Furthermore, to be effective, it is critical to administer consequences that are contingent on behavior (e.g., Podsakoff et al., 1982). Consistent with this, several studies have indicated that managers who monitor subordinate behavior relatively frequently are more effective than managers who monitor less frequently, presumably because monitoring enhances a manager's ability to provide consequences contingent on behavior (e.g., Komaki, 1986; Komaki, Desselles, & Bowman, 1989).

The power holder's skill in using punishment effectively should be as critical to the potential for influencing behavior as is his or her skill in using reinforcement contingencies. Although methods such as extinction can decrease undesired behavior, research indicates that punishment may be more effective at least in the short term; for instance, punishment produces a faster decrease in undesired behavior (see Johnston, 1972, for a review). Research also indicates that, just as with reinforcement, a number of variables affect the effectiveness of punishment, such as delay, schedule, and source (for reviews, see Arvey & Ivancevich, 1980; Kazdin, 1975). For example, reinforcing alternative behavior in combination with punishing undesired behavior has been found to improve the effects produced by punishment alone (e.g., Arvey & Ivancevich, 1980; Herman & Azrin, 1964; Podsakoff et al., 1982; Sanders, 1971).

There has been controversy on the use of punishment (e.g., Sidman, 1989; Skinner, 1938, 1948; Solomon, 1964) for a number of reasons, including ethical considerations as well as side effects of punishment that can interfere with learning (e.g., emotional reactions and aggression; Azrin & Holz, 1966). However, these side effects are often absent in research with humans in applied settings (Johnston, 1972), an out-

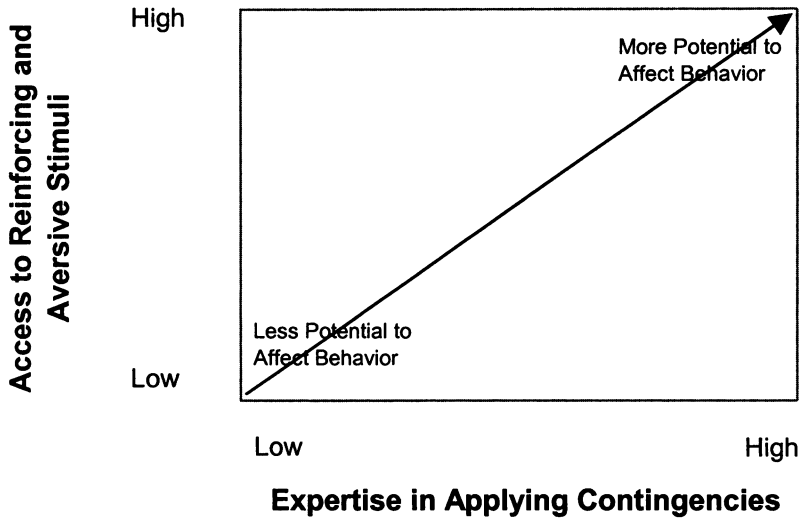

Figure 1. Potential to affect behavior as a function of access to stimuli and expertise in applying contingencies.

come that has been attributed to the milder forms of punishment used and the fact that reinforcement is often presented in conjunction with punishment (Kazdin, 1975). Nevertheless, this controversy does suggest that limitations of coercive power should be considered in organizations, especially because organizational power holders may not apply punishment in the same way as researchers and because power holders are often in an organization for long periods of time. For example, workers are likely to avoid and escape situations in which punishment is probable; therefore, the long-term use of punishers by power holders is thought to lead to erosions of power, such as through high rates of employee turnover and absenteeism (Sidman, 1989). Operant research is needed to examine how best to use punishment without eroding power over the long term. Similarly, the long-term consequences of power holders' use of negative reinforcement should be examined.

A caveat should be made at this point regarding underlying assumptions with regard to the potential to influence behavior. Situational variables could also be expected to moderate an individual's potential for influence, despite his or her level of access to stimuli and skill in using them. Research has demonstrated that some situational characteristics (e.g., the degree to which a task is structured) serve to enhance the leader's goals, whereas others serve to work against the leader (see, e.g., Kerr & Jermier, 1978; Podsakoff, MacKenzie, & Bommer, 1996). Thus, the potential to influence behavior will be a function not only of the power holder's control over consequences and level of skill in using them but also of various situational characteristics that serve to constrain or enhance the power holder's potential for influence.

Figure 1 illustrates how access to stimuli, and expertise in delivering them as consequences, are thought to affect power, the potential for influence over behavior. The continuum along the x axis represents the degree to which an individual has developed expertise in delivering consequences effectively, such as through education and practice. The continuum along the y axis represents the degree to which the individual has access to stimuli that can be used as consequences. The diagonal arrow moving from the lower left to upper right signifies that, with other factors held constant, there will be greater potential for influencing be-

havior as both of these variables increase. The area representing the greatest potential influence over behavior is illustrated in the upper right corner. Here, the individual has access to reinforcing and aversive stimuli and can also use them skillfully as consequences. When one or both of these factors are low, however, less potential to control behavior can be expected, illustrated by the area on the lower left.

The minimum possible influence over behavior is expected to occur when the power holder has neither access nor skill. When he or she has no access to reinforcing or aversive stimuli, any skill in applying consequences will be wasted. However, a complete absence of access to stimuli is unlikely because the ability to deliver verbal praise or reprimands is almost always present. A more common situation is probably one in which the power holder has no skill in using contingencies effectively. In this case, the power holder's level of access to the stimuli is immaterial.

When a power holder has little access to consequences other than verbal approval or disapproval, it can be helpful to the power holder to be surrounded by discriminative stimuli that were previously correlated with control over reinforcers. These stimuli may provide the power holder with temporary influence over behavior. For instance, a manager who has been demoted may continue to decorate the office with pictures and certificates that indicate his or her previous level of influence. Because of these stimuli, workers may have a tendency to respond as if the manager still had the same level of power. However, this behavior is likely to cease after workers experience the new contingencies.

Assuming some minimal level of both access and skill, a power holder might compensate for a limited level of one of these components of power by drawing on an increased level of the other. This possibility is consistent with research findings that power holders who report that they are relatively powerless or that they have low expectations for correcting a worker's performance will tend to use harsher means of influence (Goodstadt & Hjelle, 1973; Instone, Major, & Bunker, 1983; Kipnis & Lane, 1962). A power holder who is uncertain that others will comply with requests, perhaps due to a lack of interpersonal skills, may try to compensate by drawing on access to large magnitudes of aversive stimuli.

Nevertheless, having limited levels of either component of power does cap the potential to influence others' behaviors. Imagine, for example, a power holder with a fixed amount of access to stimuli that can be used as consequences but increased skill in using contingencies due to recent training in OBM. The training provides the power holder with more potential to influence worker behavior (signified by moving left to right in Figure 1), but influence is capped by the limited resources. Alternatively, imagine a power holder who has been promoted to higher and higher levels without receiving much experience or training in effectively managing contingencies. This promotion provides the power holder with more access to reinforcing and aversive stimuli that can be used to influence worker behavior (signified by moving upward in the diagram). However, total potential for influence is capped by a lack of skill in using contingencies effectively. A form of this latter type of problem has been encountered in a number of organizations that have empowered employees by increasing the power they have over decision making. Organizations such as Sandstrom Products (Whitford, 1995), Cin-Made (Frey, 1996), Harley-Davidson (Teerlink, 2000), and Springfield Remanufacturing Corporation (Hanson & Bollier, 1993) discovered that workers needed to be trained or have experience with empowerment to benefit from it.

In summary, an operant analysis suggests the following with regard to a power holder's access to stimuli and

skill in using them to influence behavior:

4. In general, the minimum level of power will occur when an individual has either little or no access to stimuli that can be used as consequences and little or no skill in using the stimuli effectively as consequences.

5. When either access to stimuli or skill in using them is limited, an individual's potential for influence is increased if he or she is surrounded by discriminative stimuli that were previously correlated with control over reinforcement. However, this influence over behavior will cease if contingencies are never properly implemented.

6. The most potential for influence will occur when the power holder has both a high degree of access to stimuli that can be used as consequences and high expertise in how to use the stimuli as consequences.

Identifying Power Holders

Recall that research on French and Raven's (1959) model suggested that the power holder's control of reinforcing and aversive consequences is correlated more than any other power base with worker conformity, and that the larger the power holder's scope of power, the more conformity will occur (Warren, 1968). However, the degree to which managers control institutional resources varies both within and across organizations. Some managers are able to give subordinates tangible rewards such as a pay increase, but other managers have little influence over these rewards because they are determined by union contracts or the organization (Podsakoff, 1982). In addition, managers have been rated higher in reward and coercive power the higher they are in the organizational hierarchy (e.g., Yukl & Falbe, 1991). Thus, individuals differ in their levels of social power within and across organizations due to their different levels of access to reinforcing and aversive stimuli that can be used as consequences.

Workers, in their effort to obtain positively reinforcing consequences and avoid aversive ones, are likely to assess who in the organization has power and to what degree by observing a number of stimuli that are correlated with the delivery of consequences in organizations. Indeed, nonverbal stimuli such as facial expression and body posture have been found to affect perceptions of various power bases, including reward power (Aguinis, Simonsen, & Pierce, 1998). Stimuli also include the power holder's behaviors and their outcomes, such as the ability to place items on the agenda at policy meetings (Kanter, 1979). Other stimuli may be verbal, such as a job title, and physical, such as office location. Stimuli may also include how others behave towards the power holder, such as their degree of deference.

Some of the power bases identified in the literature have weaker correlations with worker conformity than others (Warren, 1968). The power bases other than control over consequences may be less directly related to contingencies. Thus, the discriminative stimuli for these power bases would control less behavior. For example, a power holder could have legitimate power, as identified by French and Raven (1959), via a position or title, but could have no real control over resources to be able to enact any contingencies. A power holder with expertise as a power base (French & Raven) can steer others to do the correct behaviors, but there is no guarantee the behaviors will result in rewards. The power holder with expertise may not be able to provide consequences for the behavior, and rewards may or may not be available from other sources. The degree of power derived indirectly from access to those who have the other bases of power (Mintzberg, 1983) is likely to depend on the reliability and delay with which consequences are delivered. If one power holder is dependent on another to make consequences available, the consequences may be less reliable and delivered with greater delay. This difficulty is likely to be ex-

acerbated the farther apart the power holders are in terms of the formal organizational hierarchy and the informal social network.

Stimuli related to power can come to influence behavior in one of at least two ways. First, stimulus control may have resulted from direct-acting contingencies—through individuals' direct experience of the relation between antecedent stimuli and the delivery of reinforcing or aversive stimuli by other individuals (e.g., MacKintosh, 1983). In other words, power holders surrounded by the discriminative stimuli are likely to occasion responses from workers who have learned from experience, either with this particular set of stimuli or a similar set, that these stimuli are predictive of the availability of consequences. Stimulus generalization would be expected to occur at times, such as with a new power holder surrounded by stimuli similar to, but not exactly the same as, those of the previous power holder (e.g., a big desk in a slightly different style, different degrees displayed on the wall).

Research suggests that a second mechanism, rule following, may also operate with human behavior. Rule following can determine both the form of a response and its probability of occurrence (Vaughan, 1989). Humans may develop rules about the contingencies of reinforcement to which they have been exposed and behave according to their rules, regardless of the actual contingencies (Agnew & Redmon, 1992). Rule-governed behavior is thought by some to account for the fact that the response patterns of verbal humans differ significantly from the response patterns of nonhumans and nonverbal humans (e.g., Bentall, Lowe, & Beasty, 1985; Leander, Lippman, & Meyer, 1968).

An example of a rule that could be derived from direct experience with a contingency is "If I perform well, my hard work will show on the feedback graph and my supervisor may decide to give me a raise" (Agnew & Redmon, 1992, p. 70). In the case of power, a possible rule that specifies a response to a discriminative stimulus is "Respond to the directions of this titled individual to get his approval." In addition, rule-governed behavior can occur when a person without direct experience with a certain stimulus is instructed by someone who does have direct experience (Mawhinney, 1975). For instance, an experienced worker may tell a new employee, "Do not counter this titled individual or you'll get in trouble."

Rules are useful because when they accurately describe contingencies, behaviors appropriate to the contingencies can emerge rapidly (e.g., Baron, Kaufman, & Stauber, 1969; Weiner, 1970). On the other hand, when rules are inconsistent with actual contingencies, inappropriate behaviors can emerge and continue, reflecting decreased sensitivity to the actual consequences of responding (e.g., Buskist, Bennett, & Miller, 1981; S. C. Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986). Rules also are thought to augment effects of contingencies in which consequences are delayed, improbable, small, or of cumulative significance (Agnew & Redmon, 1992; L. J. Hayes, Thompson, & Hayes, 1989; Malott, 1989, 1992). It has been suggested that rules do this by setting up an immediate controlling circumstance that affects behavior until the delayed or weak consequences can exert more direct control (Malott, 1989).

Rules are thought to sometimes function as a type of establishing operation, in that they can alter the effectiveness of other stimuli as reinforcers and punishers (Poling, 2001). An establishing operation affects behavior by changing the value of a specific consequence (Michael, 1993; Olson, Laraway, & Austin, 2001). It is likely that other stimuli besides rules function in organizations as establishing operations for responses to power holders. For example, stimuli indicating that a given individual has a high position in the organizational hierarchy (e.g., office or desk size) may not only signal

that consequences are available but also serve to increase the value of a compliment from that power holder. In the presence of that power holder, the workers may increase their output to earn the compliment. Other types of establishing operations, such as satiation and deprivation, might also operate with regard to workers' responses. For example, workers whose managers have relatively low power might frequently experience deprivation of positive reinforcers for their performance. Given this deprivation, one would expect them to be especially likely to increase productivity when someone with a high degree of power is in the vicinity.

In summary, based on an operant analysis, the following are some expectations with regard to the role of environmental stimuli in identifying power holders:

7. In some situations, stimuli become predictive of power through a worker's direct exposure to contingencies. In other situations, rules may identify power holders and appropriate responses to them.
8. Responses occasioned by new stimuli will depend on the degree to which the stimuli are similar to ones previously related to power.
9. Responses to power holders may vary as a function of establishing operations present in organizations.

Measuring Power

Power has traditionally been assessed through surveys; for example, workers are asked to rate the extent to which their superiors have different bases of power or superiors are asked to rate the extent to which departments have different amounts of power. This methodology has been criticized as problematic (Podsakoff & Schriesheim, 1985; Schriesheim, Hinkin, & Podsakoff, 1991). Problems include the lack of uniform measures, a focus on traits rather than behaviors, and the use of single items or measures that fail to provide a complete picture of power. For instance, in a study published in the *Academy of Management Journal,* power was measured by asking 23 senior executives to categorize each of three departments into a forced distribution of high, medium, and low power (Sheridan, Slocum, Buda, & Thompson, 1990). The low interrater agreement of 62% indicates that serious problems existed with this global rating of power.

In contrast, OBM emphasizes the direct and ongoing measurement of actual behavior as it occurs in context (Frederiksen, 1982). OBM often draws upon observations of clearly specified target behaviors, which offers a number of advantages over traditional measurement methods in organizations, including relatively high interrater agreement (Komaki, 1986; Komaki, Collins, & Thoene, 1980). For example, in the area of safety, behavior analysts have developed measures of behaviors and outcomes related to safety that workers control and that are readily observable, such as walking around rather than under or over conveyor belts (Sulzer-Azaroff, 1982). Behavior analysts who study leadership have developed methods to sample directly the key supervisory behaviors of providing antecedents, monitoring performance, and providing consequences (Komaki, 1998). A comparison of the traditional paper-and-pencil rating method of studying leader behaviors to the Operant Supervisory Taxonomy and Index (OSTI) found that managers typically overestimate the amount of time they spent providing consequences (Komaki, 1998).

Similarly, applying operant methods to measuring power could help to improve the literature on power by defining power in terms of specific, observable behaviors and outcomes, creating a taxonomy of these various behaviors and outcomes, directly sampling interactions of power holders using observation or archival data such as e-mails, and coding these samples according to the taxonomy. For instance, the present discussion suggests that at least three

aspects of power should be included in a power taxonomy and index to obtain a complete assessment of an individual's power level. First, formal authority over institutional resources inherent in the person's position in the organization should be assessed. This could be measured by examining job descriptions. Second, one would need to know the person-based resources the individual has control over that are desired (e.g., expertise and approval) or avoided (e.g., disapproval) by others. An assessment of person-based resources might include coding observations for the frequency of requests of approval or feedback from the power holder (e.g., "How am I doing?"). Third, the extent and nature of an individual's networks would need to be assessed. This could be measured by observing the frequency and nature of interactions the power holder has with others horizontally and diagonally across the organizational hierarchy.

Developing an accurate operant measure of power could still be a challenge, however. For instance, if researchers choose to measure power by observing the proportion of behavioral compliance to the power holder's requests, only a fraction of an individual's potential for influence is likely to be captured. Compliance may not always be directly observable; different individuals are likely to use their potential for influence to different extents; and compliance is a function of a number of factors other than the consequences the power holder controls and his or her skill in applying them. However, these kinds of issues are resolvable and not unfamiliar to behavior analysts who have created observational systems for measuring complex behaviors in organizations. For example, Komaki (1998) described the many iterations and variations of the OSTI, which was developed and refined over a number of years to achieve a measure of supervisory and subordinate interactions that was both sensitive and reliable.

POTENTIAL CONTRIBUTIONS OF A BEHAVIOR ANALYSIS OF POWER

Social power lends itself well to a behavioral analysis. A number of predictions about power are possible, based on effects found in the literature on operant conditioning, some of which have been presented here. Behavior analysis could contribute to the literature on social power in organizations by providing a more parsimonious and complete account than other approaches have. A behavior analysis of power also lends itself to a greater understanding of related organizational processes such as empowerment and politics. For instance, operant principles could be used to understand the political activities managers engage in to increase their power and to pursue goals that favor their own interests (e.g., forming coalitions with managers who have similar interests to lobby for an organization to pursue new strategies; March, 1962; Vrendenburgh & Maurer, 1984).

Extensions of the analysis that incorporate other important organizational dynamics are conceivable as well. For instance, conflict that arises from power struggles could be analyzed using this approach. In addition, an operant approach has already served as the basis for an analysis of resistance to organizational change (Goltz & Hietapelto, in press). Resistance is expected when the change being introduced either intentionally or unintentionally results in changes in who has control over the dimensions of reinforcing and aversive stimuli in the organization. Thus, the initial analysis described here could be built on both conceptually and empirically and eventually could be integrated with metacontingency accounts of organizational processes such as culture (e.g., Mawhinney, 1992a, 1992b; Redmon & Agnew, 1991; Redmon & Wilk, 1991) to provide a more complete picture of interactions within organizations.

A behavior analysis of power could

also serve to extend operant research and inform its practice. Reviews of the literature suggest that much of behavior analysis in the area of management has focused on the success of operant techniques in circumscribed situations (e.g., Frederiksen, 1982; Komaki, 1986). However, reinforcement principles undoubtedly account for more complex human behavior, such as political behavior and change in organizations. The present analysis suggests that social power and related processes provide a number of possible areas of investigation for operant researchers who are interested in interactions in organizations. A broader understanding of power dynamics by behavior analysts, in turn, could serve as a foundation for additional organizational interventions. For instance, programs could be developed to minimize power disruptions and therefore reduce resistance to organizational change, as has been suggested by Goltz and Hietapelto (in press).

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